Defense Electronics Focus Group

Sampling of Current Federal Solicitations

<u>BAA 07-21</u>
Agency: DARPA-DSO

Type: Presolicitation Notice

Due Date: This BAA will be through **29 February 2008.**

Website: http://www.darpa.mil/baa/baa07-21.html

The mission of the Defense Advanced Research Projects Agency's (DARPA) Defense Sciences Office (DSO) is to identify and pursue high-risk/high- payoff research initiatives throughout a broad spectrum of the science and engineering disciplines, and to transform these initiatives into important, radically new military capabilities. To carry out this mission, DSO seeks research ideas and areas that might lead to innovations in science and engineering. Therefore, DSO is soliciting proposals for advanced research and development in a variety of enabling technical areas as described below.

Advanced Mathematics: Application and development of advanced mathematics for applications of interest to the Department of Defense (DoD):

Specific areas of interest include, but are not limited to:
- Dimensionality reduction, error propagation, and uncertainty management in databases, models, and experiments;
- Modeling of materials, physics, and biology;
- Tools to predict the performance of complex systems across a variety of application domains (e.g., physics, biology, and sociology);
- Adaptive sensing, waveform design, and scheduling;
- Methods for the design of experiments that minimize the number of experiments and that maximize information for coupled non-linear systems;
- Representation and analysis of large and/or disparate data sets;
- Computational geometry and topology;
- Electromagnetic modeling and simulation;
- Quantum information sciences;
- Signal and image processing; and
- New applications of traditionally pure mathematics

BAA07-18 Microsystems Technology Office-Wide
Agency: DARPA-MTO

Type: Presolicitation Notice

Due Date: BAA open from 1/15/07-1/14/08

The Microsystems Technology Office's (MTO) mission is to exploit breakthroughs in materials, devices, circuits, and mathematics to develop beyond leading edge Microsystems components with revolutionary performance and functionality to enable new platform capability for the Department of Defense. To execute this mission, MTO supports revolutionary research in electronics, photonics, MEMS, algorithms, and combined Microsystems technology to deliver new capabilities to sense, communicate, energize, actuate, and process data and information for the war fighter.

This announcement seeks revolutionary research ideas for topics not being addressed by ongoing MTO programs or other published BAA solicitations. This BAA is primarily, but not solely, intended for early stage research that will lead to larger, focused, MTO programs in the future. Potential bidders are highly encouraged to review the current MTO programs listed on the MTO website at:
http://www.darpa.mil/mto/radprograms.html and other MTO solicitations list at: http://www.darpa.mil/mto/solicitations/index.html to avoid proposing efforts to this BAA that duplicate existing activities or that are responsive to other published MTO BAA's. Contacting MTO program managers to discuss research interests is also encouraged. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

Research areas of current interest in MTO, include, but are not limited to:
1. Low power, high performance digital and analog data processing
2. Novel electronic and photonic device demonstrations
3. Novel semiconductor materials enabling new device concepts or capabilities
4. Nanophotonics and nanoelectronic device and circuit demonstrations
5. Power Electronics
6. RF technology
7. Biological and chemical sensors
8. Quantum information science and technology
9. Chip scale navigation, timing, and control
10. Three dimensional digital, RF, and imaging technologies
11. Integrated chip-scale photonics
12. Micro-scale power generation, control, and conversion
13. Infrared and ultraviolet detectors and imagers
14. Terahertz technology
15. Optical communication technology
16. Analog-to-digital conversion
17. Co-optimization of hardware and algorithms

18.Novel complex circuit design technology
19.Trusted design and hardware technology
20.Microsystems addressing challenges in complex systems architectures
21.Scaling of macro-systems to micro and nano-scale
22.Micro and NanoElectroMechanical Systems (MEMS and NEMS)

BAA 07-37 C-Sniper
Agency: DARPA-STO

Type: Presolicitation Notice

Due Date: NOTE: Although this BAA will be open for one (1) year from the date of its publication **(May 24, 2008)** on www.fbo.gov, the Government anticipates that the majority of initial funding for this program will be committed during First Selections. To be considered for funding during First Selections, full proposals must be received no later than 4:00 PM local Arlington, Virginia time on 9 July 2007.

Website: http://www.darpa.mil/baa/BAA07-37.html

DARPA-STO is soliciting proposals for the detection and neutralization of enemy snipers before they can engage with US Forces. The program will be executed in two Phases leading to delivery of a field testable prototype suitable for operational experimentation as an integrated part of the DARPA Crosshairs system. The Crosshairs system is already under development at Mustang Technologies, Allen, TX. The purpose of the Crosshairs is to detect enemy bullets, RPGs, and mortars fired at our vehicles and to prevent them from striking the vehicle. C-Sniper will augment this capability by identifying threats before they can fire. The C-Sniper will be integrated with DARPA's Crosshairs system in Phase 2 of the program.

The enemy snipers may be operating both with, and without telescopic sights, and other optical systems in high cluttered urban environments. The C-Sniper system will operate day and night from a moving military vehicle and provide the operator with sufficient information to make a timely engagement decision. Once the decision is made, the C-Sniper will provide data and control to point and track the on-board weapon (provided in DARPA's Crosshairs system) on the selected target. The final decision to fire the weapon will be left to the operator as required per the rules of engagement. During operation, the C-Sniper must be eye safe for personnel on the vehicle and near the vehicle.
There are many significant technical challenges to overcome to make this into an operational combat system. These may include as a minimum but not limited to the following:

1) Detect enemy snipers carrying weapons before they fire a shot. Key objective is to determine where the shot may come from rather than where it came from;
2) Develop techniques to reject clutter and maximize probability of correctly detecting and locating the target;
3) Reduce system design complexity minimizing moving parts while maximizing robustness;
4) Integrate C-Sniper with DARPA's Crosshairs on military vehicles.

BAA07-07 WNaN Adaptive Network Development (WAND)
Agency: DARPA-STO

Type: Presolicitation Notice

Due Date: Submissions must be received by **Feb. 22, 2008** per Mod. 3 Full proposals
for first selections: May 24, 2007

Website: http://www.darpa.mil/baa/baa07-07.html

Wireless Network after Next (WNaN) Adaptive Network Development (WAND). The
goal of the WAND effort is to design and develop the network technologies necessary to
establish ultra-large (tens of thousands of nodes), highly-scalable, highly-adaptive ad-hoc
networks that provide robust networking across densely-connected deployments of
inexpensive wireless nodes. The WNaN premise is that WAND-enabled networks will
adapt to changing conditions and mission requirements by adjusting the topology of the
network and the operational mode of the wireless nodes, particularly at the physical and
link layers, to create and maintain a rich, multiply-connected network fabric. This rich
interconnection fabric will provide superior battlefield communications at lower system
cost and enhance survivability by ensuring information, applications, and services are
readily available within the tactical environment.

The development of wireless nodes to support WAND is ongoing under the Wireless
Adaptive Network Node (WANN) BAA (BAA06-26). Contracts have been awarded
under this BAA to develop and produce low-cost, highly adaptive wireless nodes, which
will be delivered to WAND developers for network technology development, integration,
test and demonstration. The WANN wireless node developers will develop and publish
non-proprietary network Application Program Interfaces (APIs) for design and
integration of network technologies / processes within the node. The APIs, which will be
published in the 2nd QTR FY07, are the means by which the WNaN network will be able
to control and manage the adaptive features of the wireless nodes. Feedback on the draft
APIs will be solicited from outside sources, including WAND proposers.
The WAND program will be conducted as 3 sequential phases to design, develop,
integrate, and demonstrate network technologies that support the WNaN network vision.
The developed network technologies will support network scalability and network
formation from two to tens of thousands of WNaN operational nodes.